Remarks

The above-identified application has been carefully reviewed in light of the Examiner's office action mailed on May 29, 2008, which included final rejections of all the claims presented, and the Advisory Action mailed August 6, 2008, in which the Examiner maintained the rejections. Submitted herewith is a Request for Extension of Time, and required fee, extending the period for responding to the Office Action to and including November 29, 2008.

Submitted herewith is a Request for Continued Examination (RCE), and required fee.

Without conceding the correctness of any of the Examiner's rejections, applicant has amended the present claims to facilitate the prosecution of the above-identified application to obtain an early allowance. Applicant expressly reserves the right to seek patent protection for the original claims and for any other claims that are supported by the above-identified application in one or more later-filed related applications.

Specifically, claim 26 has been amended to refer to a continuous process for preparing an alginate gel or low-methoxy pectate gel, and continuously producing an aqueous alginate sol or an aqueous low-methoxy pectate sol. Claim 48 has been amended to refer to a system in which feed points a) and b) are spaced sufficiently upstream of feed point c) such that in use the alginate or low methoxy pectate continuously forms an aqueous alginate sol or a low-methoxy pectate sol before alginate or low-methoxy pectate comes into contact with the gelling ions.

These amendments are fully supported by the present specification, for example, at page 3, line 20 to page 4, line 9. Therefore, applicant submits that the claim amendments include no new matter.

CLAIMS 26-28, 33-39, 41 AND 42 ARE NOVEL OVER WOOD

Claims 26-28, 33-39, 41 and 42 have been rejected under 35 U.S.C. 102(b) as being anticipated by Wood. For the following reasons, applicant traverses this rejection.

The present invention, as recited in independent claim 26, is directed to a continuous process for preparing an alginate gel or low-methoxy pectate gel. The continuous process comprises:

> step 1) mixing water and a dispersion of alginate or low-methoxy pectate in an in-line dynamic mixer thereby continuously producing an aqueous alginate sol or an aqueous low-methoxy pectate sol, then
>
> step 2) generating free gelling ions in the aqueous alginate sol or the aqueous low-methoxy pectate sol in the in-line dynamic mixer either a) by including in the water or in the dispersion of alginate or low-methoxy pectate a salt providing gelling ions when dissolved which is insoluble at neutral pH but soluble at acid pHs and by feeding an acid to the sol as an aqueous solution or as a dispersion or b) by feeding a dispersion of a low-solubility salt providing gelling ions to the sol, and

step 3) allowing the aqueous alginate sol or the aqueous low-methoxy pectate sol to gel after the aqueous alginate sol or the aqueous low-methoxy pectate sol has left the in-line dynamic mixer.

Wood does not disclose, teach or suggest the present invention. Wood does not disclose, teach or suggest a continuous process, which includes the step of mixing water and a dispersion of alginate or low-methoxy pectate in an in-line dynamic mixer thereby continuously producing an aqueous alginate sol or an aqueous low-methoxy pectate sol, and which further includes the step of generating free gelling ions in the aqueous alginate sol or the aqueous low-methoxy pectate sol in the in-line dynamic mixer, as recited in claim 26. Wood does not disclose, in Examples 1-3 or elsewhere, the continuous production of sol, as expressly recited in the presently rejected claims.

An important feature of the present process claims is that the sol is produced continuously.

The Examiner has stated that "Wood clearly discloses that the sol is prepared by mixing water with the gellable component in a process which is continuous (Exs. 1-3 of Wood)."

Applicant respectfully disagrees with this statement as it relates to the present claims, for example, claim 26 which includes continuously producing a sol.

The only mention of the preparation of the sol in Example 1 of Wood is as follows:

> "*A sodium alginate sol incorporating flavouring and colouring agents was prepared from the following ingredients:*
>
> | | |
> |---|---|
> | *Sodium alginate* | *0.5 gm* |
> | *Sugar* | *1.0 gm* |
> | *Orange flavouring and colouring agents* | *0.2 gm* |
> | *Water* | *50 ml"* |

There is no further disclosure in Example 1 of the method of preparation of the sol.

The quantities given above clearly indicate that Wood used a batch process and not a continuous process to produce the sol, and therefore Wood did not continuously produce a sol. A continuous process for continuously producing a sol would require the relative quantities of the ingredients to be specified in terms of flowrates, for example gm/hr or ml/hr. The specification of finite quantities of ingredients by Wood in Example 1 must result in the preparation of a single batch of a finite quantity of sol, in this case approximately 50 ml of sol.

Example 2 of Wood merely states that "50 ml of a flavoured sodium alginate sol were prepared as described in Example 1." There is no further disclosure about the preparation of the sol. Thus, Example 2 of Wood reinforces the fact that Wood is disclosing the production of a batch of sol (in this case 50 ml), and not the continuous production of sol.

Example 3 of Wood describes the preparation of the sol as follows:

> *"A sodium alginate sol incorporating flavouring and colouring was then prepared from the following ingredients:*
>
> | | |
> |---|---|
> | *Sodium alginate* | *150 gm* |
> | *Mandarin orange flavouring agent* | *10 gm* |
> | *Beta-carotene* | *1.0 gm* |
> | *Water* | *4.5 litres"* |

There is no further disclosure in Example 3 about the production of the sol.

As with Example 1, the relative quantities in Example 3 of Wood describe the production of a batch of sol (in this case 4.5 litres) and not a continuous process to continuously produce a sol, which would involve relative flowrates. Thus, Example 3 of Wood, like the other Examples of Wood, does not disclose, and does not even suggest, continuously producing a sol, as recited in the presently rejected claims. Wood does not disclose or even suggest a continuous process for continuously producing an aqueous alginate sol or an aqueous low-methoxy sol in an in-line dynamic mixer, as recited in the present process claims, such as claim 26.

Since Wood does not disclose, in Examples 1 to 3 or elsewhere, an important feature of applicant's invention recited in the present claims, applicant submits that the present process claims are clearly novel over Wood.

In view of the above, applicant submits that the claim 26 is not anticipated by Wood under 35 USC 102(b). Applicant further submits that the dependent process claims, for example, claims 27, 28, 33 to 39, 41 and 42, are not anticipated by Wood

under 35 USC 102(b) at least by virtue of their dependence on claim 26.

CLAIMS 48 AND 49 ARE PATENTABLE OVER WOOD

Claims 48 and 49 have been rejected under 35 USC 103(a) as being unpatentable over Wood. For the following reasons, applicant traverses this rejection.

The present invention, as recited in independent claim 48, is directed to a system comprising an in-line dynamic mixer with feed points through which a) a dispersion of alginate or low-methoxy pectate, b) water and c) a source of gelling ions can be separately fed to the mixer, feed points a) and b) being spaced sufficiently up-stream of feed point c) such that in use the alginate or low-methoxy pectate continuously forms an aqueous sol or a low-methoxy pectate sol before alginate or low-methoxy pectate comes into contact with the gelling ions, and a receptacle to receive the aqueous alginate sol or the low-methoxy pectate sol, the receptacle being such that the aqueous alginate sol or the low-methoxy pectate sol is maintained quiescently to produce an alginate gel or low-methoxy pectate gel.

It is a particularly advantageous aspect of the present invention that the sol does not need to be prepared in advance. Applicant has found a system in which a sol is effectively produced continuously in an in-line dynamic mixer.

Prior to the applicant's invention, sols were pre-prepared and then had to be stored in vessels before use. Such pre-preparation of sols, for example using batch processes as

disclosed in Wood, leads to problems, for example, waste of sol due to preparation of too much sol, or wasted time and/or opportunity due to preparation of too little sol, and difficulties cleaning vessels in which the pre-prepared sol is stored. See page 3, line 20 to page 4, line 9 of the present specification.

The teaching in Wood is consistent with the state of the art described above. Wood clearly describes the preparation of batches of sol, as discussed above. Moreover, Example 3 of Wood states that the alginate sol after being prepared, "was charged into one of a pair of reservoirs feeding a continuous in-line mixer ..." [emphasis added]. Thus, Example 3 of Wood makes it clear that a batch of sol is prepared which is then placed in a reservoir from which it is fed to a continuous in-line mixer (in which the pre-prepared sol is mixed with pre-prepared agar gel cubes).

Wood does not disclose or suggest a system in which the sol forms continuously in an in-line dynamic mixer, as recited in claims 48 and 49. To the contrary, Wood discloses that the sol is prepared in batches, which are then stored in the reservoir for feeding to the next part of the process. It is that batch preparation and subsequent storage of the sol disclosed by Wood that is advantageously avoided by the present claims, for example, as explained at page 3, line 20 to page 4, line 9 of the present specification. The present system claims comprise an in-line dynamic mixer in which alginate or low-methoxy pectate and water continuously form sol.

The in-line mixer mentioned in Wood performs a <u>different</u> function relative to the dynamic in-line mixer in the present invention. The in-line mixer in Wood is used to mix <u>pre-prepared sol</u> with a source of gelling ions in the form of agar gel cubes. In Wood, the sol is first made up as a <u>batch</u> and then charged into a reservoir before being fed to the in-line mixer, where, it is mixed with gelling ions. The batch-produced sol of Wood, therefore, in not produced, either as a batch or continuously, in an in-line dynamic mixer. There is no teaching or suggestion or any basis whatsoever in Wood to allow one of ordinary skill in the art to conclude that it would be obvious that the pre-prepared, batch-produced sol of Wood could be produced continuously in an in-line dynamic mixer.

Moreover, it is noted at page 10, line 18 of the present specification that the sol is made more quickly at high shear rates, while it is clear from page 2 lines 3-5 of the present specification that it has previously been thought that shear should be avoided when generating free gelling ions. A system comprising a dynamic in-line mixer to perform the combination of the steps of continuously forming the sol and generating the free gelling ions, as in the present system claims 48 and 49, would therefore be counter-intuitive and unobvious to the person of ordinary skill in the art.

Further, the mere fact that Wood uses an in-line mixer for a different purpose/function in a later part of the process would not even suggest to one of ordinary skill in the art that an in-line dynamic mixer could be used to continuously form the sol, as in the present claims 48 and 49.

It is surprising that the sol can be continuously formed in an in-line dynamic mixer and even more so that the sol can be generated in the same in-line dynamic mixer as the free gelling ions. In order to create good quality gels, it has previously been thought necessary to avoid shear where possible. See the present specification at page 2, lines 3-5. Thus, the use of in-line dynamic mixers, which create shear, would typically be kept to a minimum. Whilst Wood suggests the use of an in-line mixer to mix agar gel cubes and a pre-prepared, batch-produced sol (Example 3), it is surprising that the extra shear resulting from having a mixer sufficiently large to continuously form the sol does need lead to an unacceptable reduction in the quality of the gel formed.

Wood does not disclose, teach or suggest the present invention. Wood does not disclose, teach or suggest a system comprising an in-line dynamic mixer with feed points through which a) a dispersion of alginate or low-methoxy pectate, b) water and c) a source of gelling ions can be separately fed to the mixer. As stated above, it is a particularly advantageous aspect of the present invention that the sol does not need to be prepared in advance. In the present claims, the sol is formed continuously in an in-line dynamic mixer.

Wood does not disclose, teach or suggest in Examples 1-3 or elsewhere, any system for the continuous forming or production of sol, let alone a system for the continuous production of sol in an in-line dynamic mixer. The teaching of Wood that particles based on a second gelling agent could be formed and dispersed in a pre-prepared, batch-produced alginate or low-

methoxy pectate sol using an in-line mixer would not even suggest to the person of ordinary skill in the art that an in-line dynamic mixer could be used to combine an alginate or low-methoxy pectate with water to continuously form an aqueous alginate sol or aqueous low-methoxy pectate sol, as in the present system claims 48 and 49.

The systems and processes of the present claims are entirely different and distinct from those of Wood so that there is no reason or basis whatsoever for the person of ordinary skill in the art to modify and extend the deficient teachings of Wood to construct the systems or practice the processes of the present claims and obtain the surprising benefits, e.g., the continuous formation or production of high quality sols in a dynamic in-line mixer and the other advantages resulting therefrom as noted above, achieved by applicant. Indeed, Wood specifically teaches away from the present invention by disclosing pre-preparing and batch-producing a sol prior to introducing the already formed sol into an in-line mixer and generating gelling ions in the already formed sol in a step that does not also include the production of the sol.

In view of the above, applicant submits that claim 48 is patentable over Wood under 35 USC 103(a). Applicant further submits that claim 49 is patentable over Wood under 35 USC 103(a) at least by virtue of its dependence on claim 48.

<u>CLAIMS 29-32 ARE PATENTABLE OVER WOOD AND NUSSINOVITCH *ET AL.*</u>

Claims 29-32 have been rejected as being unpatentable under 35 USC 103(a) over Wood and Nussinovitch *et al.* (US 6299915). For the following reasons, applicant traverses this rejection.

The present invention as set forth in claims 29-32, which are dependent directly or indirectly on claim 26, is directed towards a process which includes a step of mixing water and a dispersion of alginate or low-methoxy pectate in an in-line dynamic mixer thereby <u>continuously</u> producing an aqueous alginate sol or an aqueous low-methoxy pectate sol, in which a dispersant is used to prepare the dispersion of the alginate or low-methoxy pectate. The dispersant is an anhydrous liquid dispersant which disperses or dissolves in water, and further includes the step of generating free gelling ions in the aqueous alginate sol or the aqueous low-methoxy pectate sol in the in-line dynamic mixer.

As stated above, it is a particularly advantageous aspect of the present invention that the sol does not need to be prepared in advance. The sol is produced <u>continuously</u>, as recited in the present claims.

As noted above, Wood does not disclose, teach or suggest such a continuous process, which includes the step of mixing water and a dispersion of alginate or low-methoxy pectate in an in-line dynamic mixer thereby continuously producing an aqueous alginate sol or an aqueous low-methoxy pectate sol, and further includes the step of generating free gelling ions in the aqueous alginate sol or the aqueous low-methoxy pectate sol in the in-line dynamic mixer, as recited in claims 26 and 29-32. Wood

does not disclose or even suggest, in Examples 1-3 or elsewhere, the continuous production of sol, in an in-line dynamic mixer or elsewhere.

Nussinovitch *et al.* also does not disclose, teach or suggest such a continuous process, which includes the step of mixing water and a dispersion of alginate or low-methoxy pectate in an in-line dynamic mixer thereby continuously producing an aqueous alginate sol or an aqueous low-methoxy pectate sol, and further includes the step of generating free gelling ions in the aqueous alginate sol or the aqueous low-methoxy pectate sol in the in-line dynamic mixer, as recited in claims 26 and 29-32.

Neither Nussinovitch *et al.* nor Wood discloses, teaches or even suggests the presently claimed continuous process continuously producing a sol and generating free gelling ions in the same in-line dynamic mixer, as in the present claims. Thus, Nussinovitch *et al.* fails to supply the substantial deficiencies apparent in the teachings of Wood with regard to the present claims. Therefore, the combination of Nussinovitch *et al.* and Wood does not render the present invention obvious.

In view of the above, applicant submits that the present claims, and in particular, claims 29-32, are unobvious from and patentable over Wood and Nussinovitch *et al.* under 35 USC 103(a).

CLAIMS 40 AND 43-47 ARE PATENTABLE OVER WOOD, DUGGER *ET AL.* AND MANN

Claims 40 and 43-47 have been rejected as being unpatentable under 35 USC 103(a) over Wood and Dugger *et al.* (WO

98/47392) and Mann (US 5,718,894). For the following reasons, applicant traverses this rejection.

In claim 40, which is indirectly dependent on claim 26, the present invention is directed towards a continuous process which includes a step of mixing water and a dispersion of alginate or low-methoxy pectate in an in-line dynamic mixer thereby continuously producing an aqueous alginate sol or an aqueous low-methoxy pectate sol, and in which anaerobic bacteria are introduced into the in-line dynamic mixer by incorporation into the water, and further includes the step of generating free gelling ions in the aqueous alginate sol or the aqueous low-methoxy pectate sol in the in-line dynamic mixer.

In claim 43, which is indirectly dependent on claim 26, the present invention is directed towards a continuous process in which the product of a process including a step of mixing water and a dispersion of alginate or low-methoxy pectate in an in-line dynamic mixer thereby continuously producing an aqueous alginate sol or an aqueous low-methoxy pectate sol and further includes the step of generating free gelling ions in the aqueous alginate sol or the aqueous low-methoxy pectate sol in the in-line dynamic mixer, is fed to livestock.

As stated above, it is a particularly advantageous aspect of the present invention that the continuously produced sol does not need to be prepared in advance. The sol is produced continuously, in an in-line dynamic mixer, as recited in the present claims.

As discussed above, Wood does not disclose, teach or suggest a continuous process which includes a step of mixing

water and a dispersion of alginate or low-methoxy pectate in an in-line dynamic mixer thereby continuously producing an aqueous alginate sol or an aqueous low-methoxy pectate sol and further includes the step of generating free gelling ions in the aqueous alginate sol or the aqueous low-methoxy pectate sol in the in-line dynamic mixer, as recited in claims 26, 40 and 43-47. Wood does not disclose, teach or even suggest, in Examples 1-3 or elsewhere, the continuous production of sol.

Dugger *et al.* also does not disclose, teach or suggest such a continuous process which includes a step of mixing water and a dispersion of alginate or low-methoxy pectate in an in-line dynamic mixer thereby continuously producing an aqueous alginate sol or an aqueous low-methoxy pectate sol and further includes the step of generating free gelling ions in the aqueous alginate sol or the aqueous low-methoxy pectate sol in the in-line dynamic mixer, as recited in claims 26, 40 and 43-47.

Like Wood and Dugger *et al.*, Mann also does not disclose, teach or suggest a continuous process which includes a step of mixing water and a dispersion of alginate or low-methoxy pectate in an in-line dynamic mixer thereby continuously producing an aqueous alginate sol or an aqueous low-methoxy pectate sol and further includes the step of generating free gelling ions in the aqueous alginate sol or the aqueous low-methoxy pectate sol in the in-line dynamic mixer, as recited in claims 26, 40 and 43-47.

None of Wood, Dugger *et al.* or Mann disclose, teach or even suggest the presently claimed continuous process or continuously producing a sol and generating free gelling ions in the same in-

line dynamic mixer, as in the present claims. Dugger *et al.* and Mann fail to supply the substantial deficiencies apparent in the teachings of Wood with regard to the present claims. Therefore, the combination of Wood, Dugger *et al.* and Mann does not render the present invention obvious.

In view of the above, applicant submits that the present claims, for example, claims 40 and 43, are unobvious from and patentable over Wood, Dugger *et al.* and Mann under 35 USC 103(a). Applicant further submits that claims 44 and 45 are patentable over Wood, Dugger *et al.* and Mann under 35 USC 103(a) at least by virtue of their dependence on claim 43 and that claims 46 and 47 are patentable over Wood, Dugger *et al.* and Mann under 35 USC 103(a) for the same reasons *mutatis mutandis* as claim 43.

CONCLUSION

In conclusion, applicant has shown that the present claims are novel over the prior art under 35 U.S.C. 102(b) and are unobvious from and patentable over the prior art under 35 U.S.C. 103(a). Therefore, applicant submits that the present claims, that is claims 26-49, are allowable and respectfully requests the Examiner to pass the above-identified application to

issuance at an early date. Should any matters remain unresolved, the Examiner is requested to call applicant's attorney at the telephone number given below.

Respectfully submitted,

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